

Chief, Protected Resources Division
National Marine Fisheries Service – F/NWO3
525 NE Oregon Street, Suite 500
Portland, OR 97232-2737

Dear Chief of Protected Resources:

Enclosed is an application for permission to sample endangered Snake River sockeye salmon under Section 10 of the Endangered Species Act. This research involves enumerating and PIT tagging sockeye smolts emigrating from Pettit and Alturas lakes, ID.

- A. Application for Permit for Scientific Purposes under the Endangered Species Act of 1973.
- B. Listed species targeted for this permit is Snake River sockeye salmon *Oncorhynchus nerka* (Redfish Lake ESU) and spring/summer chinook *Oncorhynchus tshawytscha*.
- C. 05 January 2001
- D. Doug Taki – fisheries biologist/program manager
Shoshone-Bannock Tribes
Fisheries Department
P.O. Box 306
Fort Hall, ID 83203
Telephone 208.478.3914
Fax 208.478.3742
Email fishdept@allidaho.com
- E. 1. Principle Investigator – Doug Taki (resume attached)
Project Biologist – Bert Lewis (resume attached)
2. Ken Ariwite – Senior Technician
Robert Trahant – Technician
Angelo Teton – Senior Technician
Evelyn Galloway – Technician
3. Bonneville Power Administration
Jeff Gislason – COTR
Fish and Wildlife – EWN-4
P.O. Box 3621
Portland, OR 97208-3621
Telephone 503.230.3594
Email jcgislason@bpa.gov
4. N/A
5. All incidental mortalities will be transferred to the University of Idaho for genetic analysis. A subsample of *O. nerka* may be taken for proximate and health analysis. This take is covered under Section 10 Permit number 1120 (Idaho Department of Fish and Game).
- Matt Powell
University of Idaho
Hagerman Experiment Station
3059F National Fish Hatchery Road
Hagerman, ID 83332
Telephone 208.837.9096
Email fishdna@micron.net
6. N/A

F. The purpose of this study is to enumerate (and PIT tag a proportion of) Snake River sockeye salmon smolts emigrating from Pettit and Alturas lakes, ID. This information is required to estimate overwinter survival, downstream migration survival, downstream migration timing, compare growth rates from various release strategies, and calculate smolt to adult return rates. Smolts will be captured using a rotary screw trap on Alturas Lake Creek and a weir on Pettit Lake Creek. This activity is one task of the Shoshone-Bannock Tribes (SBT) sockeye research project. Other tasks include limnological monitoring and evaluation of sockeye rearing lakes, lake carrying capacity estimates, lake nutrient enhancement, and evaluating predator effects on *O. nerka* population dynamics in relation to different release strategies.

1. Snake River sockeye salmon were officially listed as endangered in November 1991 (FR 58619). In December 1993 the NMFS designated Redfish, Pettit, Alturas, and Yellowbelly lakes (including their inlet and outlet streams) as Designated Critical Habitat (58 FR 68544). Because of the listing, a Technical Oversight Committee (TOC) was formed to oversee all actions regarding Snake River sockeye recovery. Current members of the TOC include the SBT, the National Marine Fisheries Service (NMFS), the University of Idaho (UI), the Idaho Department of fish and Game (IDFG), the Bonneville Power Administration (BPA), the Idaho Division of Environmental Quality (DEQ), and the U.S.D.A. Forest Service (USFS). All agencies involved in this program share the common goal of a naturally produced self sustaining population of Snake River sockeye. This proposed activity has been endorsed by the TOC and functions in direct support of state and federal programs for the recovery of Snake River sockeye.

Progeny from the captive broodstock program were first released into Redfish Lake in 1994, Pettit Lake in 1995, and Alturas Lake in 1997. These three are the only lakes that rear the Redfish Lake ESU. Since the initial release, several release strategies have been incorporated including, early summer direct lake, late summer/fall direct lake, net pen rearing, fertilized egg box plants, adult releases, and smolt releases. With the exception of the smolt release, information gathered by this activity is critical in evaluating the relative success of the different release strategies.

2. This activity is consistent with recommendations from the Northwest Power Planning Council (1994) and the Snake River Salmon Recovery Team (1994).
3. As previously mentioned, this project is part of an inter-agency recovery effort. Information from this project may be helpful for future attempts at sockeye reintroductions in areas where they have been extirpated. Nursery lake to Lower Granite Dam survival estimates may be useful for downstream researchers estimating their incidental catch of Snake River sockeye.
4. These activities complement work being done by the IDFG (Permit number 1120) and the NMFS (Permit number 1148). This work assists in the evaluation of the relative survival of progeny from the captive broodstock program in Pettit and Alturas lakes, ID. IDFG conducts similar research under Permit number 1120 at Redfish Lake. Coordination with all agencies involved (SBT, IDFG, NMFS, UI, USFS, DEQ) during bimonthly Technical Oversight Committee meetings.

5. Redfish Lake ESU sockeye are the target species for these activities. Since the objectives of this project include estimating overwinter survival, downstream migration timing and survival, and smolt to adult return rates it would be fruitless to try and use an unlisted species.

We are also evaluating growth rates and condition of overwintered sockeye from the different release strategies. An example of a current evaluation is summer versus fall releases and comparing hatcheries where they were reared prior to release. The fish were differentially marked by each strategy before they were released into the lakes. It is essential to capture these fish as soon as they leave the lakes for these comparisons to be valid.

SNAKE RIVER chinook are also caught in our Alturas Lake screw trap. During three years of trapping we caught 240 Snake River chinook with no mortalities. (Taki 1998, Taki 1999, Taki 2000).

G.

1. This activity was initiated in 1996 and will continue as long as captive broodstock progeny are released into the lakes. The trapping season begins in late April and runs through early June.
- 2.a. Fish will be captured with a rotary screw trap in Alturas Lake Creek and a weir in Pettit Lake Creek. The weir design was approved by NMFS engineers (Schneider 1995). The trap and weir will be checked (cleaned and fish removed) immediately after sunrise and just before sunset during the majority of the trapping season. During initial and peak runoff, the trap and weir will be checked at a minimum of six hour intervals or more often depending on debris build up.

We will transfer the first one hundred sockeye captured per day to a live box. A maximum of fifty of those fish will be PIT tagged. The number to PIT tag per day will be based on a three-day moving average calculated from three years of trapping in order to ensure the entire run is represented. The remainder of the sockeye, and all chinook will be counted and released immediately. Live and recovery boxes for both locations are 1.5' x 2' x 1.5' and are located in the streams. All ESA listed fish handled out of water will be anesthetized. Fish that are handled will be weighed, measured, and a portion PIT tagged.

- 2.b. We will use standard 12 mm ISO PIT tags. We will follow tagging guidelines set forth by the PIT tag Steering Committee.
- 2.c. A stock solution of 15 grams of MS222 and 30 grams of sodium bicarbonate per liter will be used to anesthetize fish prior to handling. We will soak needles in a 70% alcohol solution at least ten minutes before using to insert tags.
- 2.d. We will hold all PIT tagged fish for release at dusk in the recovery boxes mentioned above.
- 2.e. N/A

3. Although capture of all fish is passive in nature, there is a possibility for injury or mortality to occur. Physical damage caused by ice or other debris is possible as well as predation by other fish (northern pikeminnow *Ptychocheilus oregonensis*, bull trout *Salvelinus confluentus*) if they occupy the live box concurrently. The frequency in which the trap and weir are checked is determined by the number of fish captured and the accumulation of debris. When run off begins and debris build up increases, the traps are cleaned more frequently to prevent any physical damage to captured fish. Cinder blocks with openings that a smolt sized fish may enter but not larger fish and large woody debris are placed in the live boxes for concealment cover for captured smolts.

H.

1. Snake River sockeye salmon *Oncorhynchus nerka* (Redfish Lake ESU)
Snake River spring/summer chinook salmon *Oncorhynchus tshawytscha*0

When the [original] permit application was prepared a total of eight chinook salmon redds were counted the prior year (2000) in Alturas Lake Creek. Aerial surveys conducted in 2001 and 2002 indicated eighteen and thirteen chinook salmon redds in Alturas Lake Creek, respectively. Using the calculations in Section 4.a. of the permit request, we estimated capturing approximately one hundred chinook salmon smolts per redd, and were given a take of 800. Since there were at least eighteen redds in 2001, we have the potential to capture 1,800 chinook salmon smolts. Therefore, I am requesting the level of take to be changed as indicated in the table below. It should be noted that to the best of my knowledge we have had no chinook mortalities in the Alturas Lake screw trap in the last nine years. Based on this, we are not requesting a change in the indirect mortality.

*In addition to chinook salmon smolts there is the potential to capture many fry as well. In 2003 we counted five chinook salmon redds immediately above our screw trap location. Using the same rationale as in the original request, we could potentially capture 3,534 fry from those redds (5 redds * 4,500 eggs * 56.1% egg to parr survival * 28% mean trap efficiency).*

The project biologist and senior technician have changed since the permit was authorized. Personnel that should be changed are – Andy Kohler replaced Bert Lewis, Vernon Kayiou replaced Angelo Teton.

<u>ESU</u>	<u>Life Stage</u>	<u>Origin</u>	<u>Type of Take</u>	<u>Maximum Take</u>
SnR Sockeye Salmon	Juvenile	Naturally-Produced	Capture, Handle, Release	5,600
SnR Sockeye Salmon	Juvenile	Naturally-Produced	Capture, Tag/Mark Release	1,400
SnR Sockeye Salmon	Juvenile	Naturally-Produced	Indirect Mortality	140
SnR S/S Chinook Salmon	Juvenile	Naturally-Produced	Capture, Handle, Release	800 1,800 or 5,400
SnR S/S Chinook Salmon	Juvenile	Naturally-Produced	Indirect Mortality	16

2. We intend to sample from 15 April through 10 June every year. The dates may be altered based on stream conditions (run-off, etc.). Both trapping locations are in the headwaters of the Salmon River, Idaho. The Pettit Lake Creek weir is located at river kilometer 522.303.633.002.002 (Section 31, Township 8 North, Range 14 East). The Alturas Lake Creek trap is located at river kilometer 522.303.633.003 (Section 32, Township 8 North, Range 14 East).

3. sockeye

Pettit Lake – Snake River sockeye were first reintroduced into Pettit Lake in 1995 (Teuscher and Taki 1996, Kline and Lamansky 1997). Total numbers of pre-smolts stocked in that lake have ranged from a low of 3,430 in 1999 to a high of 12,051 in 2000 (five year mean = 8,024). No fish were released in 1996. We anticipate approximately 12,000 pre-smolts will be released into Pettit Lake in future years (TOC September 2000). Survival to outmigration has ranged from 11.2% in 1997/98 to 61.8% in 1998/99. During those two years extreme freshets caused us to discontinue sampling and estimates were back calculated from downstream dam interrogations (Lewis et al. 2000, Griswold et al. in review).

Alturas Lake – Snake River sockeye were reintroduced into Alturas Lake in 1997 (Taki et al. 1999). Total number of pre-smolts stocked in that lake has ranged from 94,746 in 1997 to 12,012 in 2000. There is no current release target selected for this lake because the cyclic kokanee population confounds lake carrying capacity estimates. Survival from release to outmigration has been similar for all three years (30.1% - 34.3%).

The first adult return attributed to the release of progeny from the captive broodstock program into Pettit and Alturas lakes occurred when twenty-seven adult sockeye returned in 2000. These fish were intercepted at the Sawtooth Fish Hatchery so lake of origin could not be identified.

chinook

Alturas Lake Creek – Redd counts for Alturas Lake Creek during the 1990's indicated the number of redds ranged from zero to seven (StreamNet website; B. Snyder, IDFG, pers. Comm., 16 Dec. 1997). Aerial redd counts in 2000 indicated eight redds. The primary observer felt that they may have flown before peak spawning had occurred (G. Gadwa, IDFG, pers. Comm., 05 Jan. 2001).

- 4.a. sockeye

Pettit Lake Creek – We anticipate handling (measuring and weighing) 1,300 smolts and PIT tagging up to 700 fish. Past weir operations have resulted in an indirect mortality of 2%. If we captured 2,000 fish this would result in forty mortalities ($2,000 * 0.02$). Using current limnological conditions, 30% of the sockeye released into the lake should survive to outmigration. With anticipated releases of 12,000, there is the potential for 3,600 smolts to pass the weir. Migration occurs much later from Pettit Lake than Alturas and Redfish lakes. Depending on snowpack, past experience has shown that we may be able to only capture fish during a three week period.

Alturas Lake Creek - We anticipate capturing up to 6,000 and handling (measuring and weighing) 1,300 smolts and PIT tagging up to 700 fish. During three years of operation we have had an indirect mortality of 0.3%. This would result in a mortality of 17 fish if 6,000 were captured ($6,000 * 0.003$).

chinook

Alturas Lake Creek – Kiefer and Lockhart (1997) estimated survival rates for naturally spawning chinook in the upper Salmon River. Egg deposition for a chinook in the upper Salmon River averages 4,500. The highest observed egg-to-parr survival over the seven year study was 56.1%. During the same period the highest observed overwinter survival was 23.2%. Using those survival rates we could expect each redd to produce 586 smolts ($4,500 * .561 * .232 = 585.68$). The 1994 Biological Opinion (NMFS 1994) states that 50% of the chinook smolts should outmigrate prior to 1 May. Since we would like to begin trapping in mid-April, we propose using a more conservative estimate of 40%. Our trapping efficiencies have ranged from 19% to 34% (mean = 28%) depending on discharge. With a maximum of eight redds we have the potential to capture 786 chinook smolts ($8 \text{ redds} * 586 \text{ smolts} * 0.60 * 0.28$). Although we have not experienced any chinook mortality, using the 0.3% mortality rate for sockeye would result in a total of two chinook. A more realistic, yet not unreasonable rate of 1% would yield eight mortalities.

- 4.b. See H.1.
- 4.c. smolt
- 4.d. unknown
- 4.e. Sockeye smolts captured will be progeny from the captive broodstock program. These fish can come from release as pre-smolts, adult volitional spawning, or eyed egg box plants. Chinook smolts are naturally produced.
- 4.f. capture, measure, weigh, PIT tag
- 4.g. See H.2.
- 4.h. See H.2.
- 5. See H.4.a, any mortality will be unintentional
- 6. See H.4.a.
- I.
 - 1. N/A
 - 2. N/A
 - 3. In the event of an extreme freshet that endangers any fish, both trap and weir will be taken out immediately.

- J. This project is a component of the Snake River recovery program. If deemed necessary by the TOC (and approved by NMFS) fish may be transferred to either the IDFG or NMFS captive broodstock programs.
- K. 1. Section 10 Permit #998 (1996 – 2000)
- 2.a. Snake River sockeye salmon *Oncorhynchus nerka*
- 2.b. Pettit Lake weir
1996 – Twelve sockeye mortalities were caused by approach velocities exceeding recommended levels. The engineering firm redesigned the stream channel above the weir to allow for decreased approach velocities at high flows for future operation.
1998 – Three indirect sockeye mortalities of unknown cause.
1999 – Nine indirect sockeye mortalities of unknown cause.
- Alturas Lake screw trap
1998 – Five indirect sockeye mortalities of unknown cause.
1999 – Seven indirect sockeye mortalities of unknown cause.
2000 – Three indirect sockeye mortalities of unknown cause.
- L. “I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (ESA) and regulations promulgated thereunder, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or to penalties under the ESA.”

Signature

Date

Doug Taki Fisheries Biologist/Program Manager

- M. 1. nineteen hours
2. \$15.00

References

- Griswold, R.G., D. Taki, and B. Lewis. In review. Snake River Sockeye Salmon Habitat and Limnological Research: 1999 Annual Report. Project Number 91-71. Bonneville Power Administration.
- Lewis, B., D. Taki, and R.G. Griswold. 2000. Snake River Sockeye Salmon Habitat and Limnological Research: 1998 Annual Report. Project Number 91-71. Bonneville Power Administration.

- Kiefer, R. B., and J. N. Lockhart. 1997. Intensive Evaluation and Monitoring of Chinook Salmon and Steelhead Trout Production, Crooked River and Upper Salmon River Sites. Project Number 91-73. Bonneville Power Administration.
- Kline, P.K., and J.A. Lamansky. 1997. Research and Recovery of Snake River Sockeye Salmon: Annual Report 1995-1996. Project Number 91-72. Bonneville Power Administration.
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- Schneider, M. 1995. Letter to Mr. Clint Smith, Montgomery Watson Engineers dated 21 August 1995.
- Snake River Salmon Recovery Team. 1994. Snake River Salmon Recovery Team: Final Recommendations to the National Marine Fisheries Service.
- Taki, D. 1998. 1998 Annual Report for Section 10 Permit #998.
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- Taki, D., and B. Lewis. 1999. Snake River Sockeye Salmon Habitat and Limnological Research: 1997 Annual Report. Project Number 91-71. Bonneville Power Administration.
- Technical Oversight Committee. 2000. Meeting notes from 20 September 2000. Available from the Bonneville Power Administration.
- Teuscher, D., and D. Taki. 1996. Snake River Sockeye Salmon Habitat and Limnological Research: 1995 Annual Report. Project Number 91-71. Bonneville Power Administration.